

An Interactive Geospatial Web App for Local Access and Public Health: Mobilizing Technology to Disseminate Data and Build Community Knowledge

Babu Gounder^{1*}, Seongha Cho², Christy Da Rosa³, Argentina Coy¹

¹ School of Social Work, University of Illinois Urbana-Champaign, Urbana, U.S.

² Department of Social Welfare, Seoul National University, Seoul, South Korea

³ School of Social Work, Portland State University, Portland, U.S.

*gounder2@illinois.edu

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Introduction

Community and nonprofit workers understand the health of the populations they serve, but lack access to social determinants of health (SDOH) data for local areas that are disseminated in trustworthy and useful ways for action (Schmidhuber et al., 2023). This study aims to reimagine health science and geography through an engagement project that pilots a Community Environmental Health Data Access and Research web app (CEHDAR) and explores research questions by asking community workers what their perceptions are on the usability of 1) public health data, 2) the CEHDAR app, and 3) the app's relevance to their work.

Method

Utilizing a SDOH & Place toolkit with human-centered design principles (Marrone et al., 2022), we use customized coding and packages in R Shiny for a web app (Abhilash & Sheeba, 2019). We developed our interactive CEHDAR app with user transparency, legibility, and agency in mind. The app featured Illinois census-tract data that are publicly available from sources including the Center for Disease Control, Census Bureau, and Federal Emergency Management Agency on health outcomes, socio-demographics, healthcare, environmental exposures, and climate events. We organized mall focus group to explore questions in one-hour discussions with community workers recruited by convenience sampling.

Results

Our web app spatialized and visualized data using thematic maps, organized data into different tabs, explained data sources, and converted variable measures into meaningful numbers (e.g., polluted days above WHO limits instead of PM2.5 concentrations). It incorporated user-interactivity, such as location search, data variable selection, and census tract comparisons on panels aside the maps. Along with maps, the app included

accompanying charts with data at the county-level compared to average county levels across the state. Figures 1, 2, and 3 provide screenshots of the app.

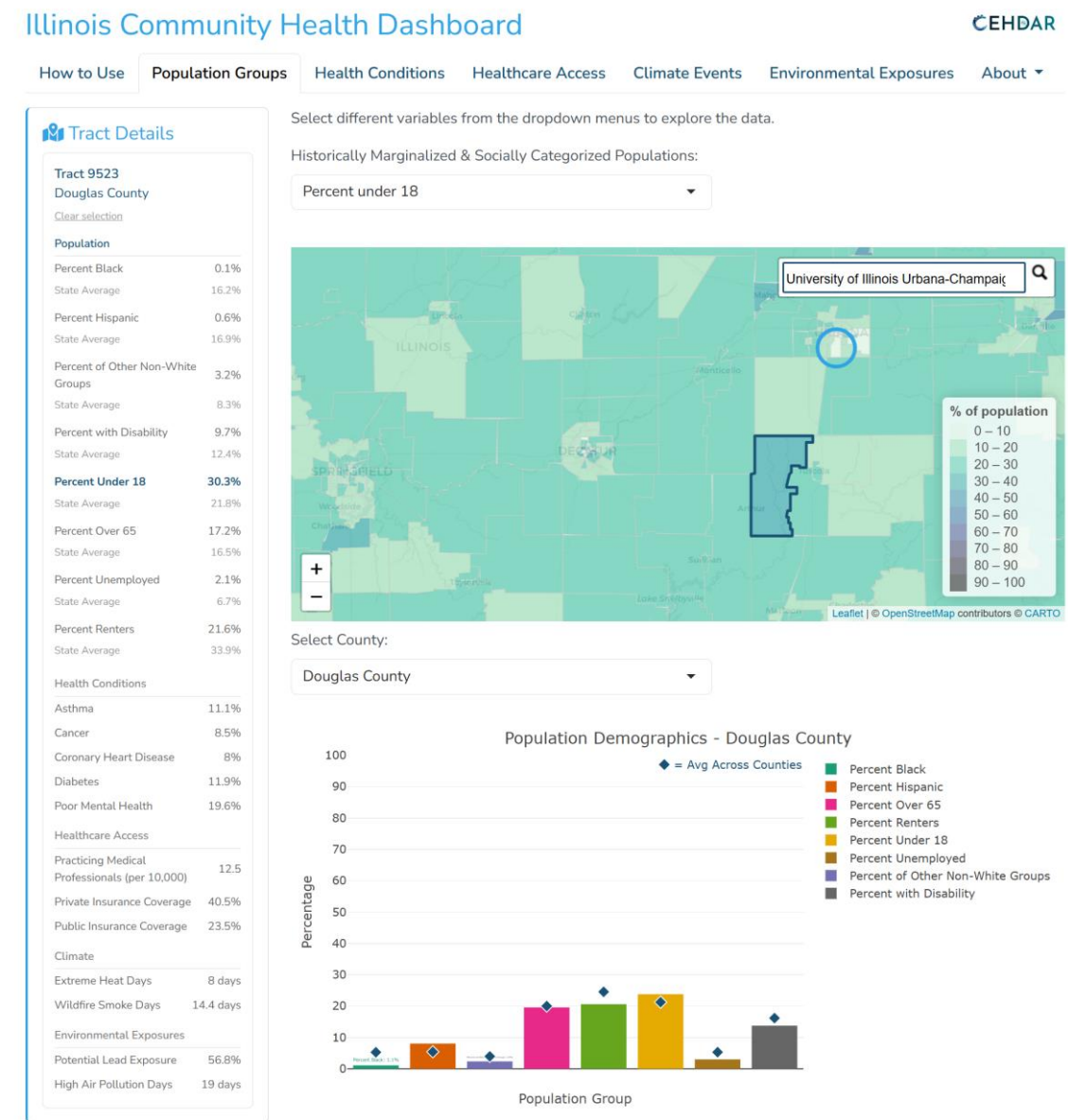


Figure 1. Population Groups tab in the app displaying a thematic map with the location search function, side panel for tract comparison, and bottom panel for county-level charts.

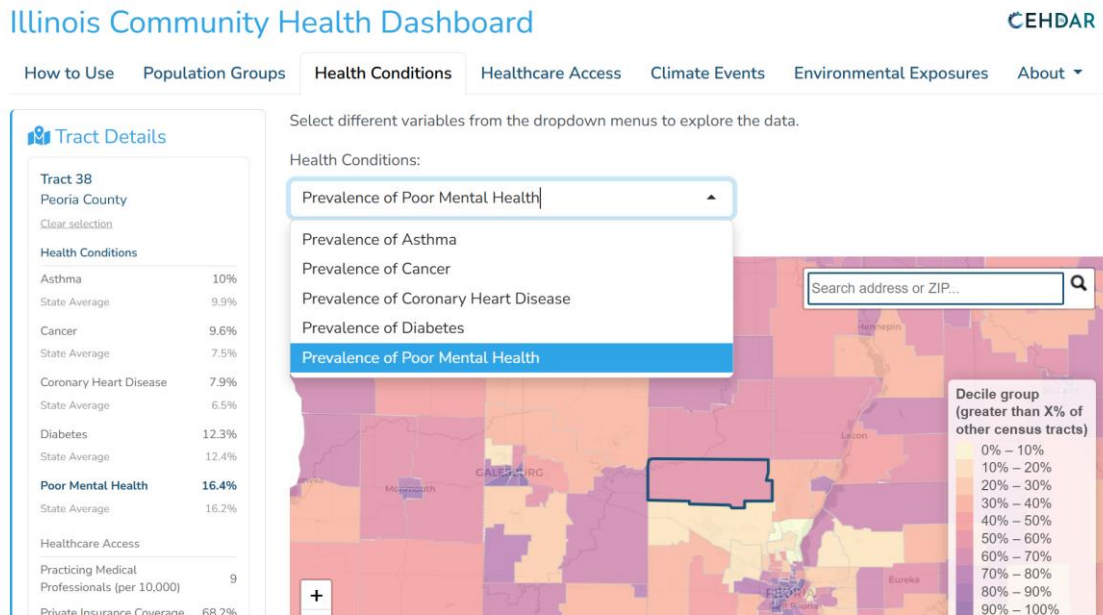


Figure 2. Health Conditions tab in the app displaying the data variable selection for the map.

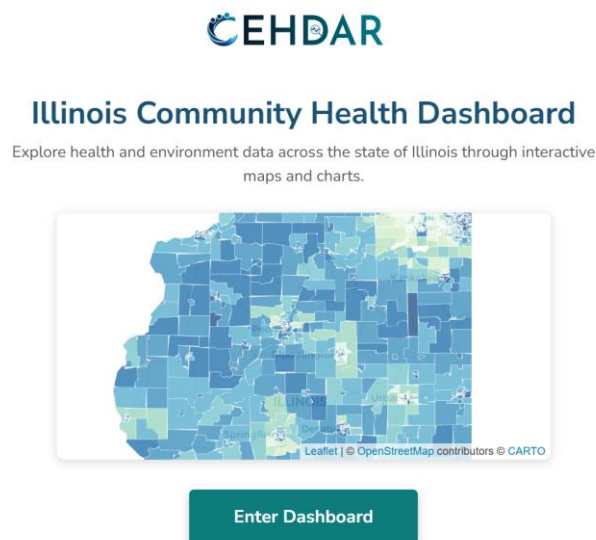


Figure 3. User-friendly landing page for the CEHDAR app.

Thematic coding and analysis from initial focus groups (N=8) of social workers, educators, nonprofit employees, and activists revealed challenges in finding data to use and trust (e.g., concerns about motives behind public data). Enthusiasm was expressed for the CEHDAR app for transparent, comprehensible, and interactive information of multiple data points through maps and the accompanying charts. Participants in the focus groups also indicated that the app is relevant and informative for their work by identifying local dimensions of health vulnerabilities and structures (e.g., neighborhoods with low private health insurance coverage, less medical professional density, potential lead exposure, or high number of extreme heat days).

Discussion and Conclusion

This study provides initial evidence for an engaging and influential way to share and disseminate public health and health geography data that can be translated into meaningful uses and actions within communities by local workers and organizers. Human-centered interactive web apps of spatialized data provide an avenue to engage in communities and work toward reducing health disparities.

Abstract Word count: 500

References

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